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reached low ebb in March and April, and is now on the increase. The states west of Mississippi River, which in 1914 produced less than 13 per cent. of the total, do not appear to have suffered from this decrease as much as the eastern states—reports from certain districts in the west showing an increase over 1914. This is attributed to the increase in metal mining and smelting, and to greater railroad activity. In the east the loss of bunker trade on the Atlantic seaboard and the slowness of the Lake season have been only partly offset by the increasing coal exports. The recent activity in the iron business has been slow to affect the coal trade, although coke has gained considerably during the last two months and for the rest of 1915 the increased output should continue. The anthracite producers have fared better than the soft coal operators, since it is estimated that the output of anthracite has fallen off only from 3 to 5 per cent. below the average for 1914.

THE portion of the National Forest receipts for the fiscal year 1915 to go to the benefit of the various states in which the forests lie, according to the computation of the forest service just approved by the secretary of the treasury, amounts all told to more than \$850,000. The gross receipts for the year ending June 30 were \$2,481,469.35, of which under the law 25 per cent. is paid over to the states for county school and road purposes and an additional 10 per cent. is made available for expenditure by the secretary of agriculture in building road and trails for the benefit of local communities. Montana gets the largest share, having contributed the largest amount of receipts for the sale of timber, grazing and other uses of the forests, or more than \$318,000. Of this amount, Montana is to receive \$79,589.78 for county school and road purposes, while the forest service will expend \$31,835.91 for improvements of special benefit to local communities and not included in the regular administrative and protective improvements. Idaho comes second with a 25 per cent. allowance of \$75,651.15 and a 10 per cent. fund of \$30,260.46. California is third, receiving a 25

per cent. allowance of \$67,611.87 and a 10 per cent. fund of \$27,044.74. The total amount to be expended under this system of sharing the forest receipts with the states to make up for the loss of local taxes due to public ownership of the land is about \$16,000 greater than for the previous fiscal year, as the receipts for the fiscal year 1915 exceeded those of the previous fiscal year by about \$44,000. The provision of law under which a portion of the receipts is turned over to the states dates from 1906, and the total payments reach, with this year's allotment, nearly \$4,500,000. The ten per cent. provision for government-built public roads has been in force only since 1912, and has now made available for this purpose an aggregate of \$926,000.

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#### UNIVERSITY AND EDUCATIONAL NEWS

THE Southern Methodist University, Dallas, Texas, begins its initial session September 22. This is a coeducational institution under the auspices of the Methodist Episcopal Church South. The assets of the university in grounds, buildings and endowment amount to about one million and seven hundred thousand dollars. This university is to become the head of the southern Methodist colleges west of the Mississippi River. An active campaign is now being waged for an additional million dollars. The following appointments have been made on the scientific staff: Robert S. Hyer, A.M., LL.D., professor of physics; Frederick M. Duncan, Ph.D., professor of biology; John Henry Reedy, Ph.D. (Yale), professor of chemistry; Ellis W. Shuler, Ph.D. (Harvard), associate professor of geology.

PLANS have been approved by the board of regents of the University of Nebraska for a new hospital in connection with the College of Medicine at Omaha. The building is to be five stories in height and will have six wards of sixteen beds each, three receiving rooms, six groups of isolation rooms of three beds each, and the necessary operating rooms, operating amphitheater, and rooms for administration and service.

At the sixty-third annual meeting of the American Pharmaceutical Association, which was held in San Francisco during the week of June 9, the president of the association, Mr. Caswell A. Mayo, of New York, announced that Mr. Samuel W. Fairchild had agreed to provide funds for a scholarship in pharmacy paying \$300 annually, to be awarded to an undergraduate student by a commission composed of the presidents of the American Pharmaceutical Association, the American Conference of Pharmaceutical Faculties, the National Association of Boards of Pharmacy, and the editor of the *Journal of the American Pharmaceutical Association*.

Two new foundations are announced at Leeds University—the William Walker scholarship, of the annual value of £90, for the scientific study of leather with a view to its subsequent application to industrial development, and the William Walker Exhibition, for instruction in the technology of coal and its by-products. The new endowments are founded in memory of the late Mr. William Walker, of Whitehaven, by his widow and his sons, Mr. Herbert W. Walker and Mr. Arthur Walker. Both are primarily tenable at Leeds by inhabitants of the Whitehaven and Bootle districts, and the donors have placed £4,500 in trust for the purpose.

PROFESSOR IVEY F. LEWIS, of the University of Missouri, has become Miller professor of biology and head of the school of biology at the University of Virginia.

At the Montana State College, R. H. Bogue, formerly at the Massachusetts Agricultural College, has been appointed assistant professor of chemistry and geology; Henry M. Shea, formerly of the South Dakota State College, analyst of the food and drug laboratory, and H. B. Foote, formerly of Oklahoma, instructor in botany.

DR. PAUL H. DIKE has been appointed professor of physics in Robert College, Constantinople, to succeed Professor Manning, who died last year. He sailed on the Greek line to Piraeus on September 15 with his family, together with a number of the members of the faculty of Robert College. The college is to

open in spite of the war, and it is hoped that the party will be able to get through without much delay. The women and children will await developments in Athens.

## DISCUSSION AND CORRESPONDENCE

### THE LAWS OF MOTION

How well some of us remember and how much some of us have heard of the days of Thomson and Tait, and how satisfied we were and are with what Thomson and Tait had to say on this subject! In those days scarcely any one understood the laws of motion, but nowadays, thanks largely to the influence of Thomson and Tait, the chief confusion is that which rises from slightly different points of view, mostly correct; and the laws of motion now constitute the topic in the discussion of which one pays the least attention to what others say, and quite properly so.

We do, however, believe that it is misleading to speak of *the* fundamental equation of dynamics. Given three bodies *A*, *B* and *C*, and three identifiable forces *a*, *b* and *c*. Let the acceleration of each body due to each force be observed, and let the results be as shown in the accompanying table.

TABLE OF OBSERVED ACCELERATIONS

		Bodies		
		<i>A</i>	<i>B</i>	<i>C</i>
Forces	<i>a</i>	25	30	35
	<i>b</i>	50	60	70
	<i>c</i>	75	90	105

The acceleration varies from body to body for a given force, and from force to force for a given body. These are two equally fundamental modes of variation, and corresponding to them we have two equally fundamental laws of variation; and these laws of variation are entirely independent of the measurement of force and mass. Let us suppose that the above table has been extended so as to include a great many different forces and a great many different bodies, then a careful inspection of